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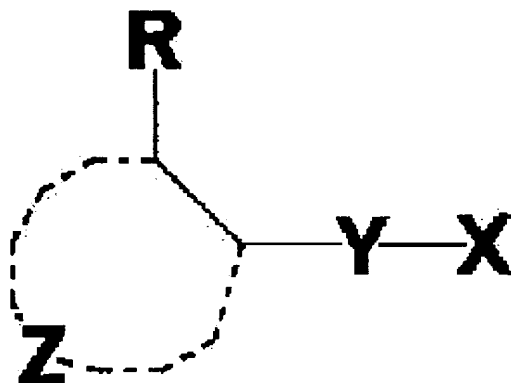
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(54) NEW COMPOUND AND LIGHT-EMITTING DEVICE USING THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a compound having good hole transportability and, simultaneously, excellent durability, and an light-emitting device having high luminance and excellent durability containing the same by using the light-emitting device into which the compound is incorporated.

SOLUTION: The compound is represented by formula (1) (wherein X is a hole transporting group; Y is a divalent connecting group or a mere bond; Z is a group of  $\geq 3$  atoms capable of forming a ring structure; R is a hydrogen atom or a substituent; at least one of the group having substituted the site contiguous to the site at which X is connected to Y and R is a group other than a hydrogen atom; and R may be connected to Z to form a ring structure), and the light-emitting device comprises the compound.



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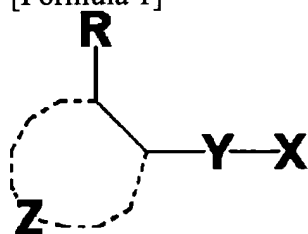
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## CLAIMS

[Claim(s)]

[Claim 1] The compound expressed with a general formula (1). General formula (1)

[Formula 1]



X is the radical of electron hole transportability. Y is a divalent connection radical or mere association. Z It is the atomic group which can form \*\* and three or more cyclic structures. R expresses a hydrogen atom or a substituent. At least one of the radical permuted at least by contiguity of the part which X connected with Y, and R is radicals other than a hydrogen atom. R may be connected with Z and may form cyclic structure.

[Claim 2] The compound according to claim 1 characterized by being either of the radicals in which X in a general formula (1) includes the overpi electron aromatic series heterocycle of the diaryl amino group, the radical containing a thoria reel amine, condensation, or a non-condensation mold.

[Claim 3] The compound according to claim 1 or 2 characterized by what is expressed with either of the association with which Y in a general formula (1) connects X and Z through mere association, an arylene radical, a hetero arylene radical, or one atom.

[Claim 4] The compound according to claim 1 to 3 characterized by the ring formed of Z in a general formula (1) being an aromatic series ring or a hetero aromatic series ring.

[Claim 5] The compound characterized by having two or more partial structural units which can be expressed with a general formula (1) according to claim 1 to 4 in 1 intramolecular.

[Claim 6] The light emitting device characterized by containing at least one compound according to claim 1 to 5.

[Claim 7] The light emitting device according to claim 6 characterized by using at least one sort of luminescent material which can emit light from a triplet exciton as a luminescent material.

[Translation done.]

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the new molecular entity which has electron hole transportability, and the light emitting device using them.

[0002]

[Description of the Prior Art] The researches and developments about various display devices are active, and especially, an organic electroluminescence (EL) component can obtain luminescence of the high brightness in a low battery, and attracts attention as a promising display device today. For example, the EL element which forms an organic thin film by vacuum evaporation of an organic compound is known (Applied Physics Letters, 51, p.913-, (1987)). Organic electroluminescence devices given [ this ] in reference have the laminated structure of an electronic transportation ingredient and an electron hole transportation ingredient, and its luminescence property of the is improving sharply compared with the conventional monolayer mold component. As an electron hole transportation ingredient used with this laminating mold component, overpi electron aromatic compounds, such as a thoria reel amine derivative represented by TPD (N, N'-G m-tolyl-N, N'-diphenyl benzidine), a pyrrole and a carbazole, and a thiophene, are known as an outstanding electron hole transportation ingredient. However, these compounds had high crystallinity and it turned out that organic electroluminescence devices using these compounds as an electron hole transportation ingredient have a problem in raw shelf life. The technique which introduces a condensed multi-ring aromatic series radical in the case of a thoria reel amine derivative, or uses the compound group which raised symmetric property for it as a means to solve this problem is indicated by Appl.Phys.Lett.56 \*\*, 799 pages (1990), Polymer Preprints (ACS)349 (1997), etc. Moreover, examination with the same said of nitrogen-containing heterocycle compounds, such as a carbazole derivative, and the macromolecule-ized technique are indicated by Appl.Phys.Lett.63 \*\*, 2627 etc. pages (1993), etc. Artificers also came examination in piles until now about the technique of improving preservation and drive endurance of the organic electroluminescence devices of this electron hole transportation ingredient origin.

[0003]

[Problem(s) to be Solved by the Invention] The purpose of this invention has brightness in developing the light emitting device which was highly excellent in the endurance of a component by developing the compound which has good electron hole transportation ability, and was excellent in endurance, and containing and using it for a light emitting device.

[0004]

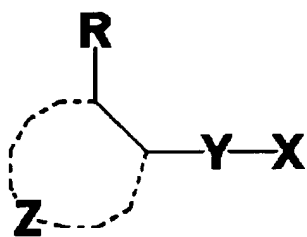
[Means for Solving the Problem] This invention was attained by the compound given in following 12 term, and the light emitting device containing it.

[0005] 1) The compound expressed with a general formula (1).

General formula (1)

[0006]

[Formula 2]



[0007] X is the radical of electron hole transportability. Y is a divalent connection radical or mere association. Z It is the atomic group which can form \*\* and three or more cyclic structures. R expresses a hydrogen atom or a substituent. At least one of the radical permuted at least by contiguity of the part which X connected with Y, and R is radicals other than a hydrogen atom. R may be connected with Z and may form cyclic structure.

2) The compound of one above-mentioned publication characterized by X in a general formula (1) being a diaryl amino group.

3) The compound of one above-mentioned publication characterized by being the radical in which X in a general formula (1) contains a thoria reel amine. 4) The compound of the above 1 characterized by being the radical in which X in a general formula (1) includes the overpi electron aromatic series heterocycle of condensation or a non-condensation mold.

5) A compound given in either of the above 1-4 characterized by Y in a general formula (1) being mere association.

6) A compound given in either of the above 1-4 characterized by Y in a general formula (1) being an arylene radical or a hetero arylene radical.

7) A compound given in either of the above 1-4 characterized by being association whose Y in a general formula (1) connects X and Z through one atom.

8) A compound given in either of the above 1-7 characterized by the ring (ring formed with the carbon which Z and R have combined, and the carbon which Y has combined) formed of Z in a general formula (1) being an aromatic series ring or a hetero aromatic series ring.

9) The compound characterized by having two or more partial structural units which can be expressed with the general formula (1) of a publication to either of the above 1-8 in 1 intramolecular.

10) The light emitting device ingredient characterized by being the compound of a publication at either of the above 1-9.

11) The light emitting device characterized by containing at least one compound of a publication in either of the above 1-9.

12) The light emitting device of 11 above-mentioned publication characterized by using at least one sort of luminescent material which can emit light from 3-fold term exciton as a luminescent material.

13) A light emitting device the above 11 in which at least one-layer organic layer was formed of spreading, or given in 12.

[0008]

[Embodiment of the Invention] First, the compound expressed with a general formula (1) is explained. The compound expressed with a general formula (1) is a compound of the structure which the radical of electron hole transportability permuted by cyclic structure through the divalent direct or connection radical. Cyclic structure or X is the compound of the structure permuted by the cyclic structure to which at least contiguity of the part combined with Y has substituents other than a hydrogen atom in the (ortho position) also especially in it. However, X is coupled directly with cyclic structure when Y is mere association. First, X which is the radical which has electron hole transportability is explained. X expresses the radical which has electron hole transportability.

[0009] The compound of the various structures of having this radical in the field concerned about the radical which has electron hole transportability is well-known. For example, the compound which has the 1-3rd class nitrogen atom, i.e., an amine derivative, is mentioned in the first place first. In it, the amine which aromatic hydrocarbon or a hetero aromatic compound permuted is desirable, and the

compound all the substituents of whose it is especially tertiary amine also in it, and are aromatic hydrocarbon or a hetero aromatic compound is desirable. For this reason, the radical which has a diaryl amino group or a thoria reel amine as X is desirable. Next, what can be mentioned is a hetero aromatic compound with a superfluous electron. As this example, a hetero atom can mention these comrades or aromatic hydrocarbon, and the compound of the condensed type to the hetero aromatic series of 5 membered-ring molds contained in [ one ] a ring structure, and a list. As the example, a pyrrole, a thiophene, a furan, Indore, a carbazole, benzothiophene, benzofuran, a dibenzo thiophene, a dibenzofuran, indolizine, etc. can be mentioned. Furthermore, the hydrazone compound which is a compound which has a nitrogen atom, a pyrazolone compound, a hydroxylamine compound, an alkoxy amine compound, etc. are usable as compounds which have the radical of electron hole transportability. [0010] Also in these overelectronic aromatic compound, especially a carbazole derivative is used preferably. Although either of the 1-9th place is possible for the permutation location when using a carbazole as a radical expressed with X, the 3rd place or the 9th place is desirable. Y is a divalent connection radical or mere association. Although an arylene radical, an alkylene group, a ether group, a thioether radical, an ester group, an amide group, a sulfonamide radical, a urethane group, an ureido radical, a carbonate radical, etc. can be mentioned as an example of a connection radical, it is mere association, an arylene radical, an alkylene group, and a ether group preferably, and they are mere association, a methylene group, or a ether group especially preferably.

[0011] Z expresses the atomic group which forms cyclic structure. The atom which forms the frame of the ring used here consists of carbon, nitrogen, oxygen, sulfur, a selenium, etc., 3-8 are desirable as the number of a ring, and its aromatic series ring or hetero aromatic series ring of 5 and 6 members is desirable especially. Moreover, Z can also be condensed with the atomic group of other ring structures. As an aromatic series ring, benzene, a xylene, toluene, naphthalene, an anthracene, a pyrene, etc. are mentioned. Moreover, as a hetero aromatic series ring, a pyrrole, a pyrazole, an imidazole, a pyridine, triazole, tetrazole, pyridazine, a pyrimidine, oxazole, an isoxazole, a thiazole, an iso thiazole, OKISA diazole, etc. are mentioned. Moreover, 5 member heterocycles (for example, a benzopyrazole, benzimidazole, benzooxazole, benzothiazole, etc.) of a benzocondensed ring mold and the condensed rings (for example, an imidazo pyridine, a pyrazolo imidazole, etc.) of heterocycles are mentioned as other rings formed by condensing with the atomic group of structure.

[0012] R expresses a hydrogen atom or a substituent. However, in this invention, it has the description that substituents other than a hydrogen atom have permuted by at least one place and/or R in like contiguity of the part connected with Y of X. here -- as substituents other than a hydrogen atom -- the alkyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) which is not permuted [ a halogen atom (for example, a fluorine atom, a chlorine atom, a bromine atom, an iodine atom), a cyano group, a formyl group, a permutation, or ] for example, a methyl group, t-butyl, a cyclohexyl radical, etc. are mentioned -- an alkenyl radical (desirable -- carbon numbers 2-30 -- they are carbon numbers 2-15 more preferably.) for example, a vinyl group, 1-propenyl radical, a 1-butene-2-IRU radical, a cyclohexene-1-IRU radical, etc. are mentioned -- an alkynyl group (desirable -- carbon numbers 2-30 -- they are carbon numbers 2-15 more preferably.) for example, an ethynyl group, 1-propynyl radical, etc. are mentioned -- an aryl group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a phenyl group, a tolyl group, a xylyl group, a naphthyl group, a biphenyl radical, a pyrenyl radical, etc. are mentioned -- a heterocycle radical (it is 5 or 6 membered-rings preferably, and you may condense with other rings.) As a hetero atom, a nitrogen atom, an oxygen atom, and a sulfur atom are mentioned, for example. desirable -- carbon numbers 2-30 -- they are carbon numbers 2-15 more preferably. for example, a pyridyl radical, a piperidyl radical, an oxazolyl radical, an oxadiazolyl radical, a tetrahydro furil radical, a thienyl group, etc. are mentioned -- the 1-3rd class amino groups (the amino group, an alkylamino radical, an arylamino radical, a dialkylamino radical, the diaryl amino group, an alkyl arylamino radical, heterocycle amino group, bis-heterocycle amino group, etc.) desirable -- the 3rd class amino group -- it is -- carbon numbers 1-30 -- they are carbon numbers 1-16 more preferably. for example, a dimethylamino radical, a diphenylamino radical, the phenyl naphthyl amino group, etc. are mentioned -- an imino group (radical expressed with -

CR11=NR12 or -N=CR 13R14.) R11-R14 are radicals chosen from a hydrogen atom, an alkyl group, an aryl group, a heterocycle radical, an alkoxy group, an aryloxy group, and the 1-3rd class amino group here. desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably -- an alkoxy group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methoxy group, an ethoxy radical, a cyclohexyloxy radical, etc. are mentioned -- an aryloxy group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a phenoxy group, a 1-naphthoxy radical, 4-phenyl phenoxy group Si, etc. are mentioned -- an alkylthio group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methylthio radical, an ethyl thio radical, a cyclohexyl thio radical, etc. are mentioned -- an aryl thio radical (desirable -- carbon numbers 6-30 -- it is a carbon number 6-15 more preferably.) for example, a phenylthio radical, a tolyl thio radical, etc. are mentioned -- a carvone amide group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, an acetamide radical, a benzoyl amide group, N-methyl benzoyl amide group, etc. are mentioned -- a sulfonamide radical (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methanesulfon amide group, a benzenesulfonamide radical, p-toluenesulfonamide radical, etc. are mentioned -- a carbamoyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a non-permuted carbamoyl group, a methyl carbamoyl group, a dimethyl carbamoyl group, a phenylcarbamoyl radical, a diphenyl carbamoyl group, a dioctyl carbamoyl group, etc. are mentioned -- a sulfamoyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a non-permuted sulfamoyl group, a methyl sulfamoyl group, a dimethyl sulfamoyl group, a phenyl sulfamoyl group, a diphenyl sulfamoyl group, a dioctyl sulfamoyl group, etc. are mentioned -- an alkyl carbonyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, an acetyl group, a propionyl radical, a BUCHIROIRU radical, a lauroyl radical, etc. are mentioned -- an aryl carbonyl group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, benzoyl, a naphthoyl radical, etc. are mentioned -- an alkyl sulfonyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methane sulfonyl group, an ethane sulfonyl group, etc. are mentioned -- an aryl sulfonyl group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a benzenesulphonyl radical, a p-toluenesulfonyl group, a 1-naphthalene sulfonyl group, etc. are mentioned -- an alkoxy carbonyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) For example, a methoxycarbonyl group, an ethoxycarbonyl radical, BUTO a KISHIKARUBONIRU radical etc. is mentioned -- an aryloxy carbonyl group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a phenoxy carbonyl group, a 1-naphthoxy carbonyl group, etc. are mentioned -- an alkylcarbonyloxy radical (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, an acetoxo radical, a propionyloxy radical, a BUCHIRO yloxy radical, etc. are mentioned -- an aryl-carbonyloxy group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a benzoyloxy radical, 1-naphthoyl oxy-radical, etc. are mentioned -- a urethane group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methoxy carvone amide group, a phenoxy carvone amide group, a methylamino carvone amide group, etc. are mentioned -- an ureido radical (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methylamino carvone amide group, a dimethylamino carvone amide group, a diphenylamino carvone amide group, etc. are mentioned -- a carbonate radical (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methoxycarbonyloxy radical, a phenoxy carbonyloxy radical, etc. are mentioned. etc. -- it can mention. Especially, an alkyl group, an aryl group, an alkoxy group, and an aryloxy group are an alkyl group and an aryl group desirable especially preferably.

[0013] R may be connected with Z and may form cyclic structure. On the radical expressed with X, Y, and Z, various substituents in addition to a hydrogen atom are replaceable. if the examples are enumerated -- the alkyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) which is not permuted [ a halogen atom (for example, a fluorine atom, a chlorine atom, a

bromine atom, an iodine atom), a cyano group, a formyl group, a permutation, or ] for example, a methyl group, t-butyl, a cyclohexyl radical, etc. are mentioned -- an alkenyl radical (desirable -- carbon numbers 2-30 -- they are carbon numbers 2-15 more preferably.) for example, a vinyl group, 1-propenyl radical, a 1-butene-2-IRU radical, a cyclohexene-1-IRU radical, etc. are mentioned -- an alkynyl group (desirable -- carbon numbers 2-30 -- they are carbon numbers 2-15 more preferably.) for example, an ethynyl group, 1-propynyl radical, etc. are mentioned -- an aryl group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a phenyl group, a tolyl group, a xylyl group, a naphthyl group, a biphenyl radical, a pyrenyl radical, etc. are mentioned -- a heterocycle radical (it is 5 or 6 membered-rings preferably, and you may condense with other rings.) As a hetero atom, a nitrogen atom, an oxygen atom, and a sulfur atom are mentioned, for example. desirable -- carbon numbers 2-30 -- they are carbon numbers 2-15 more preferably. for example, a pyridyl radical, a piperidyl radical, an oxazolyl radical, an oxadiazolyl radical, a tetrahydro furil radical, a thienyl group, etc. are mentioned -- the 1-3rd class amino groups (the amino group, an alkylamino radical, an arylamino radical, a dialkylamino radical, the diaryl amino group, an alkyl arylamino radical, heterocycle amino group, bis-heterocycle amino group, etc.) desirable -- the 3rd class amino group -- it is -- carbon numbers 1-30 -- they are carbon numbers 1-16 more preferably. for example, a dimethylamino radical, a diphenylamino radical, the phenyl naphthyl amino group, etc. are mentioned -- an imino group (radical expressed with  $\text{CR11}=\text{NR12}$  or  $\text{-N}=\text{CR13R14}$ .) R11-R14 are radicals chosen from a hydrogen atom, an alkyl group, an aryl group, a heterocycle radical, an alkoxy group, an aryloxy group, and the 1-3rd class amino group here. desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably -- an alkoxy group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methoxy group, an ethoxy radical, a cyclohexyloxy radical, etc. are mentioned -- an aryloxy group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a phenoxy group, a 1-naphthoxy radical, 4-phenyl phenoxy group Si, etc. are mentioned -- an alkylthio group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methylthio radical, an ethyl thio radical, a cyclohexyl thio radical, etc. are mentioned -- an aryl thio radical (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a phenylthio radical, a tolyl thio radical, etc. are mentioned -- a carvone amide group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, an acetamide radical, a benzoyl amide group, N-methyl benzoyl amide group, etc. are mentioned -- a sulfonamide radical (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methanesulfon amide group, a benzenesulfonamide radical, p-toluenesulfonamide radical, etc. are mentioned -- a carbamoyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a non-permuted carbamoyl group, a methyl carbamoyl group, a dimethyl carbamoyl group, a phenylcarbamoyl radical, a diphenyl carbamoyl group, a dioctyl carbamoyl group, etc. are mentioned -- a sulfamoyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a non-permuted sulfamoyl group, a methyl sulfamoyl group, a dimethyl sulfamoyl group, a phenyl sulfamoyl group, a diphenyl sulfamoyl group, a dioctyl sulfamoyl group, etc. are mentioned -- an alkyl carbonyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, an acetyl group, a propionyl radical, a BUCHIROIRU radical, a lauroyl radical, etc. are mentioned -- an aryl carbonyl group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, benzoyl, a naphthoyl radical, etc. are mentioned -- an alkyl sulfonyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methane sulfonyl group, an ethane sulfonyl group, etc. are mentioned -- an aryl sulfonyl group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a benzenesulphonyl radical, a p-toluenesulfonyl group, a 1-naphthalene sulfonyl group, etc. are mentioned -- an alkoxy carbonyl group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methoxycarbonyl group, an ethoxycarbonyl radical, a butoxycarbonyl radical, etc. are mentioned -- an aryloxy carbonyl group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a phenoxy carbonyl group, a 1-naphthoxy carbonyl group, etc. are mentioned -

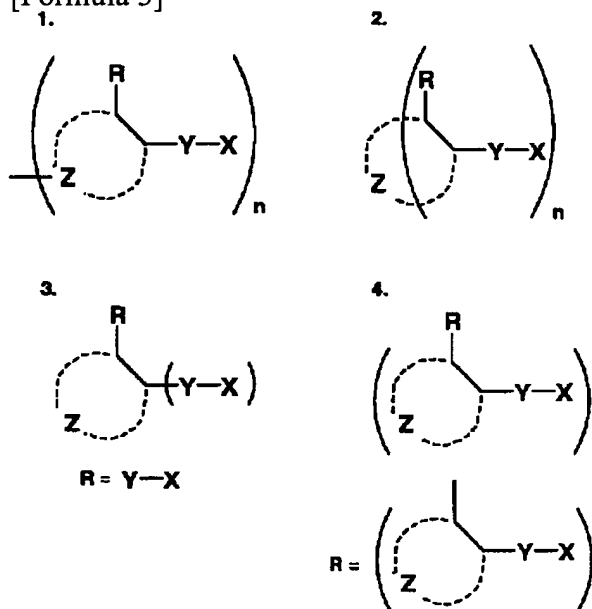
- an alkylcarbonyloxy radical (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, an acetoxy radical, a propionyloxy radical, a BUCHIRO yloxy radical, etc. are mentioned -- an aryl-carbonyloxy group (desirable -- carbon numbers 6-30 -- they are carbon numbers 6-15 more preferably.) for example, a benzoyloxy radical, 1-naphthoyl oxy-radical, etc. are mentioned -- a urethane group (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methoxy carvone amide group, a phenoxy carvone amide group, a methylamino carvone amide group, etc. are mentioned -- an ureido radical (desirable -- carbon numbers 1-30 -- more -- good -- better) \*\* are carbon numbers 1-15. for example, a methylamino carvone amide group, a dimethylamino carvone amide group, a diphenylamino carvone amide group, etc. are mentioned -- a carbonate radical (desirable -- carbon numbers 1-30 -- they are carbon numbers 1-15 more preferably.) for example, a methoxycarbonyloxy radical, a phenoxy carbonyloxy radical, etc. are mentioned. etc. -- it is .

[0014] Although the partial structural unit which can be expressed with a general formula (1) acts effectively in this invention, the compound which has two or more of these partial structural units in 1 intramolecular can be used especially preferably.

[0015] This invention defines the above-mentioned partial structural unit (repeat unit), as shown below.

[0016]

[Formula 3]



図中の括弧は繰返し単位を示す。

[0017] The parenthesis in a formula shows a repeat unit and R, X, Y, and Z are synonymous with a general formula (1). n is one or more integers. In one in a formula, you may join together through the monatomic (atomic group of n \*\*) of n \*\*, or repeat units may join together mutually.

[0018] Furthermore, the compound expressed with a general formula (1) may form the polymer compound which has instantiation structure in a part of the repeat unit. In this case, polymerization nature machines, such as polymerization nature machines, such as an ethylene nature unsaturated bond, or a carboxyl group which starts condensation polymerization, an amino group, and an ester group, are contained in X, Y, and Z, when that radical carries out a polymerization, a polymer may be formed, and a polymer may be formed, the precursor of the compound expressed with a general formula (1) forming the compound frame of a general formula (1).

[0019] the compound expressed with a general formula (1) -- low-molecular and a macromolecule -- after [ which can also use the compound used as the structure which finally discovers a function as it is even if it is which case ] carrying out, using the precursor for organic electroluminescence devices and constituting a component -- or -- the -- on the way -- it may come out and you may guide to final

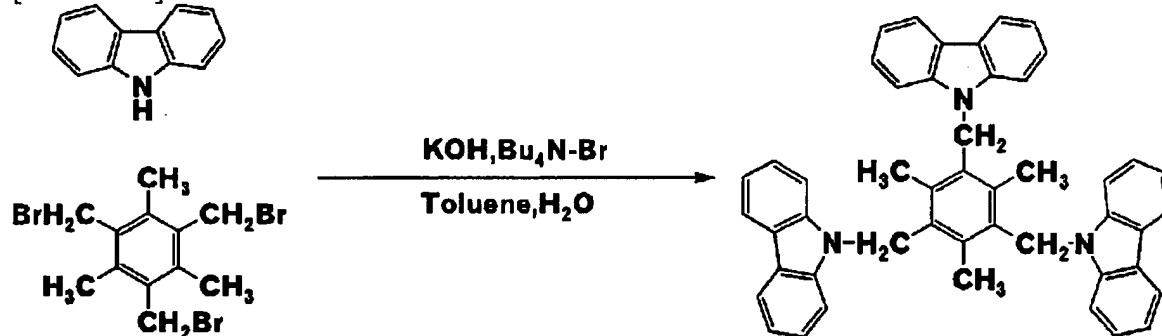


structure by physical or chemical after treatment. the case where it is used as a low molecular weight compound -- as the molecular weight -- desirable -- 200-5000 -- it is the range of 300-2000 preferably. the case where it is used as a high molecular compound -- as average molecular weight (Mw) -- desirable -- 2000-1 million -- it is the range of 5000-100000 preferably.

[0020] The compound expressed with a general formula (1) is compoundable by the well-known approach. Below, the example of a typical synthetic scheme is indicated below and the example of the compound of this invention is illustrated after that. Of course, this invention is not limited by this example.

[0021]

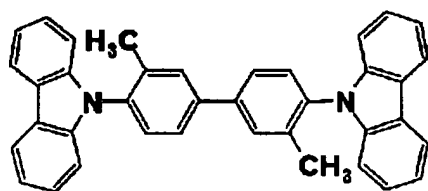
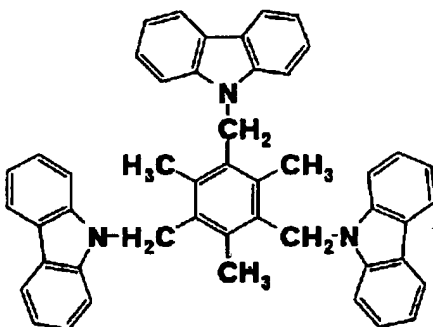
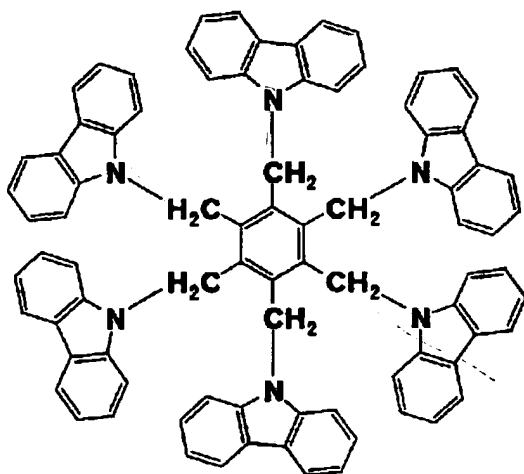
[Formula 4]



[0022]

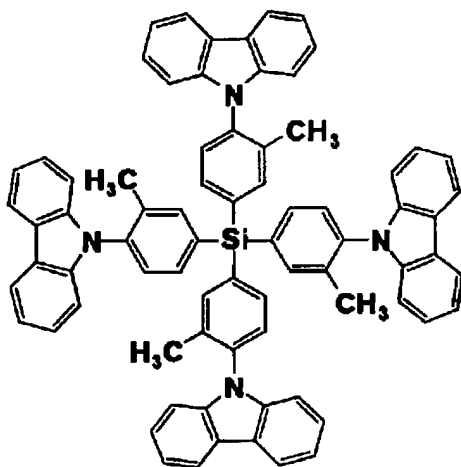
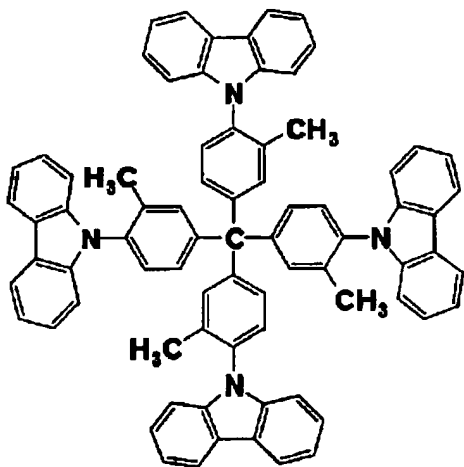
[Formula 5]

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**HT-1****HT-2****HT-3**

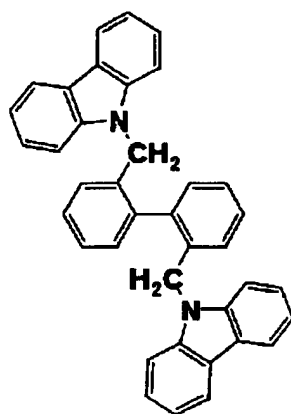
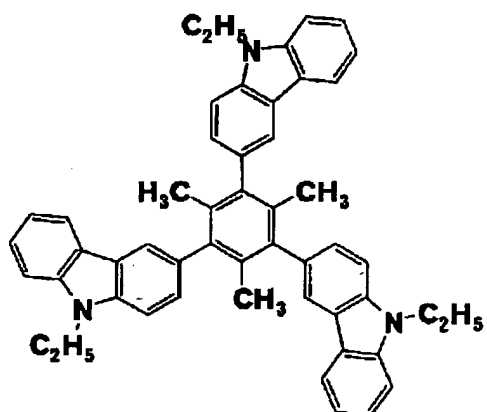
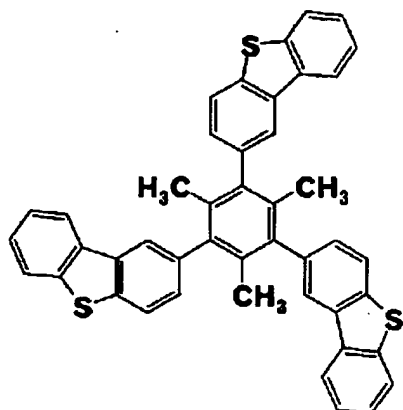
[0023]

[Formula 6]

**HT-4****HT-5**

[0024]

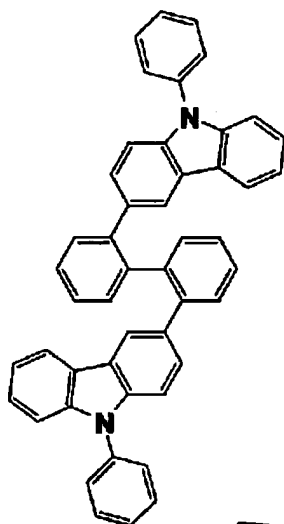
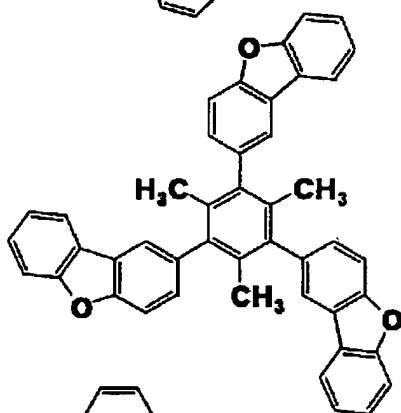
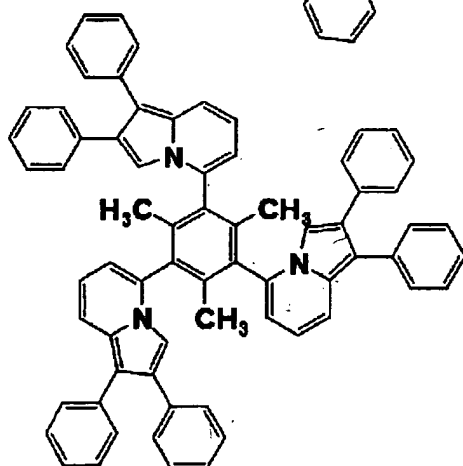
[Formula 7]

**HT-6****HT-7****HT-8**

102(b)

[0025]

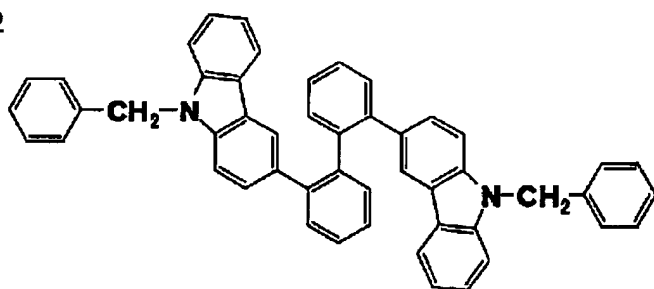
[Formula 8]

**HT-9****HT-10****HT-11**

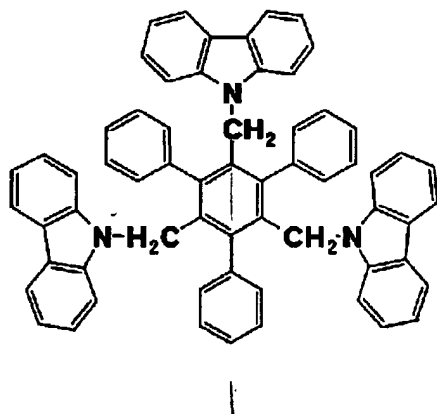
[0026]

[Formula 9]

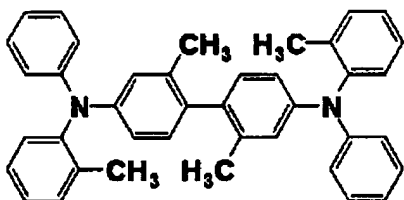
HT-12



HT-13



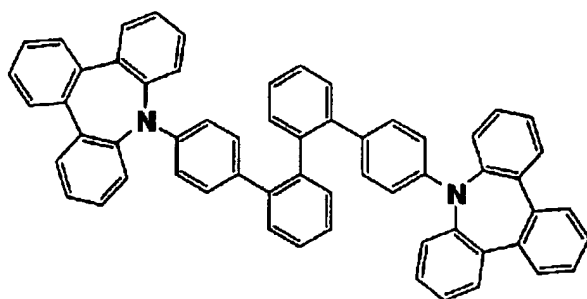
HT-14



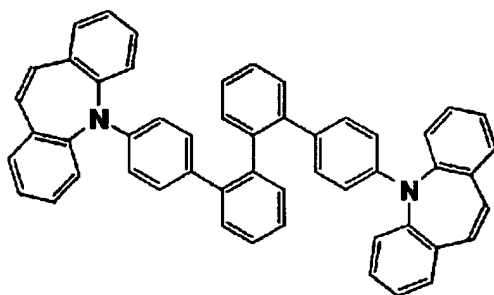
[0027]

[Formula 10]

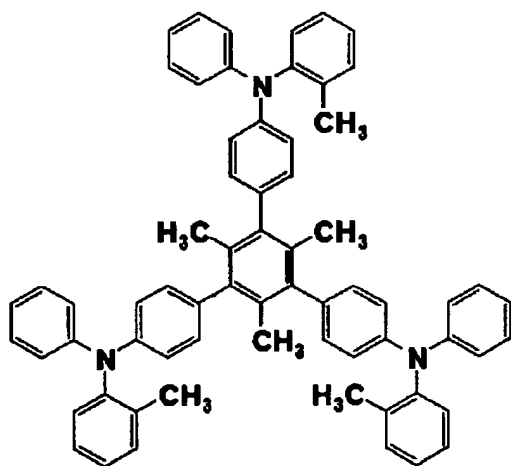
HT-15



HT-16

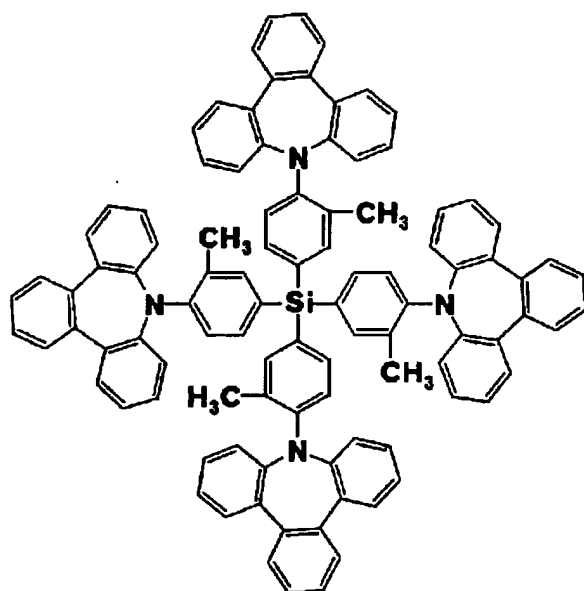
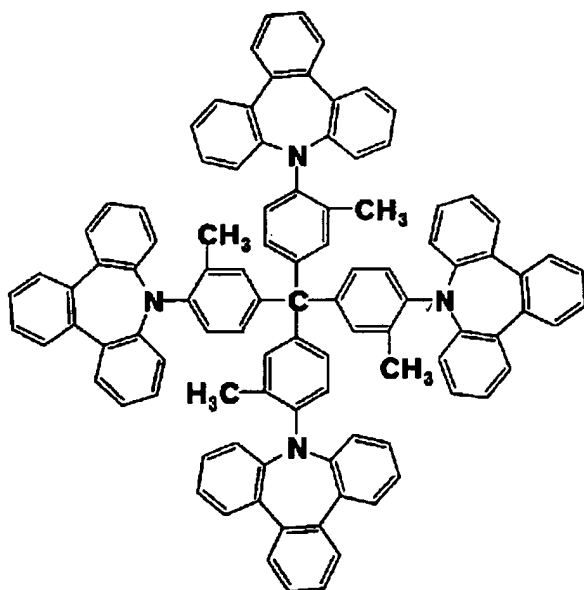


HT-17



[0028]

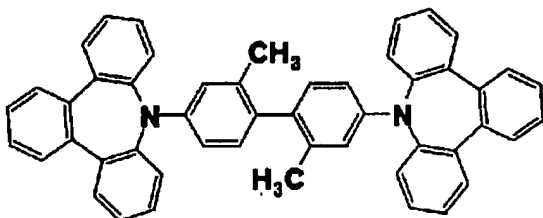
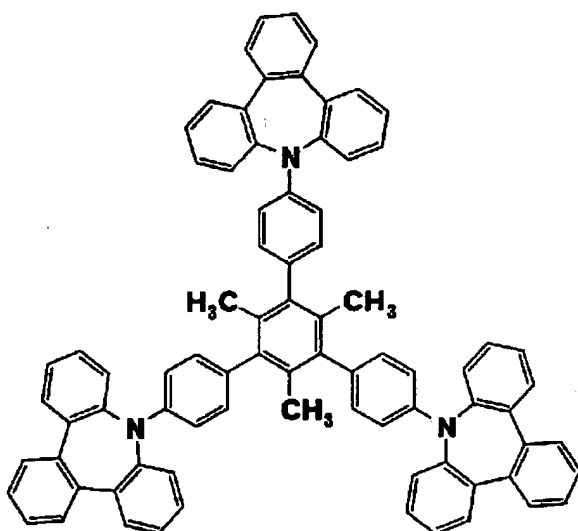
[Formula 11]

**HT-18****HT-19**

[0029]

[Formula 12]



**HT-20****HT-21**

[0030] [Composition of compound HT-2] To a thermometer and the 3000ml three-neck flask which attached the reflux condenser, they are carbazoles 167g (1.0 mols), 1, and 3 and 5-tris bromomethyl. - It was made to react under a reflux condition for 5 hours, preparing 2, 4, and 6-trimethyl benzene 120g (0.3 mols), 56g [ of potassium hydroxides ] (1.0 mols), and tetrabutylammonium bromide 10g, toluene 1000ml, and 300ml of water, and agitating using an impeller. The crystal deposited as the reaction progressed. The reaction mixture was cooled after reaction termination and water and a methanol washed after filtering a sludge. This rough crystal was \*\*\*\*\*ed from the mixed solvent of chloroform/ethanol, and 167g of crystals of compound HT-2 was obtained.

[0031] Although luminescent material is usable also in what emits light from a singlet exciton, the thing which emits light from a triplet exciton, the thing which emits light from both, and which luminescent material as a light emitting device when using the compound of this invention as a light emitting device ingredient, the effectiveness is demonstrated in combination with the luminescent material in which luminescence from a triplet exciton is included especially.

[0032] The alt.metal-ized metal-complex whose luminescent material used by this invention is a phosphorescence luminescence compound, and a porphyrin metal complex are used preferably [ at least one ], and an alt.metal-ized metal complex is used more preferably.

[0033] The alt.metal-ized metal complex used by this invention is explained. An alt.metal-ized metal complex is "organic metal chemistry-foundation and application [ - ]" p150,232. Shokabo Publishing Co., Ltd. Akio Yamamoto work The 1982 issue and "Photochemistry and Photophysics of Coordination

Compounds" p71-p77 and p135-p146 Springer-Verlag It is the generic name of the compound group indicated by issue etc. in H.Yersin work 1987. Although all are usable as a central metal of said metal complex if it is transition metals, in this invention, a rhodium, platinum, gold, iridium, a ruthenium, palladium, etc. can be used preferably especially. The more desirable thing in this is iridium. A concrete publication and the concrete example of a compound of said alt.metal-ized metal complex are indicated by the paragraph numbers 0152-0180 of an application-for-patent No. 254171 [ 2000 to ] official report. [0034] Although especially the valence of the metal of an alt.metal-ized metal complex is not limited, trivalent is desirable when using iridium. The ligand of an alt.metal-ized metal complex will not be asked especially if an alt.metal-ized metal complex can be formed. For example, it is a terrorism ring derivative (the permutation location of an aryl group is on the contiguity carbon of a terrorism ring nitrogen atom in nitrogen-containing aromatic series) to aryl group permutation nitrogen-containing aromatic series. As an aryl group, a phenyl group, a naphthyl group, an anthracenyl group, a pyrenyl radical, etc. are mentioned. To nitrogen-containing aromatic series as a terrorism ring For example, a pyridine, a pyrimidine, pyrazine, pyridazine, a quinoline, An isoquinoline, quinoxaline, phthalazine, quinazoline, a NAFUCHI lysine, Cinnoline, peri MIJIN, a phenanthroline, a pyrrole, an imidazole, [0035] to which a pyrazole, oxazole, OKISA diazole, triazole, thiadiazole, benzimidazole benzoxazole, a bends thiazole, phenanthridine, etc. are mentioned A terrorism ring derivative (the radical which the permutation location of a hetero aryl group is on the contiguity carbon of a terrorism ring nitrogen atom in nitrogen-containing aromatic series, and contains a terrorism ring derivative to the aforementioned nitrogen-containing aromatic series as a hetero aryl group, a thiophenyl radical, a furil radical, etc. are mentioned), 7, 8-benzoquinoline derivative, a phosphino aryl derivative, a phosphino hetero aryl derivative, a phosphino KISHIA reel derivative, a phosphino KISHIHETEROARIRU derivative, an aminomethyl aryl derivative, an aminomethyl hetero aryl derivative, etc. are mentioned to hetero aryl group permutation nitrogen-containing aromatic series. Among these, aryl group permutation nitrogen-containing aromatic series heterocycle derivative, hetero aryl group permutation nitrogen-containing aromatic series heterocycle derivative, 7, and 8-benzoquinoline derivative is desirable, phenyl pyridine derivative, thiophenyl pyridine derivative, 7, and 8-benzoquinoline derivative is more desirable, and thiophenyl pyridine derivative, 7, and 8-benzoquinoline derivative is still more desirable.

[0036] It is a platinum complex preferably as a porphyrin metal complex used for this invention, and is the platinum complex of bivalence more preferably.

[0037] As a light emitting device by which luminescence from a triplet exciton is observed, the green light emitting device using luminescence from an iridium complex (Ir(ppy)<sub>3</sub>:Tris-Ortho-Metalated Complex of Iridium(III) with 2-Phenylpyridine) is reported (Applied Physics Letters 75, 4 (1999)). This component has attained 8% of external quantum yields, and having exceeded 5% of external quantum yields conventionally called limitation of a component is reported.

[0038] Next, the light emitting device containing the compound of this invention is explained. Although especially the formation approach of the organic layer of the light emitting device containing the compound of this invention is not limited, approaches, such as resistance heating vacuum evaporation, an electron beam, sputtering, a molecule laminated layers method, a coating method, print processes, and the ink jet method, are used, resistance heating vacuum evaporation and a coating method are desirable in respect of manufacture, and the organic stratification approach by vacuum deposition and the applying method is possible for the compound of this invention.

[0039] The light emitting device of this invention is a component in which two or more organic compound thin films which contain a luminous layer or a luminous layer in inter-electrode [ of the pair of an anode plate and cathode ] were formed, may have a hole-injection layer besides a luminous layer, an electron hole transportation layer, an electron injection layer, an electronic transportation layer, a protective layer, etc., and may be equipped with the function of others [ each class / these ], respectively. Various ingredients can be used for formation of each class, respectively.

[0040] An anode plate can supply an electron hole to a hole-injection layer, an electron hole transportation layer, a luminous layer, etc., a metal, an alloy, a metallic oxide, electrical conductivity compounds, or such mixture can be used, and a work function is an ingredient 4eV or more preferably.

As an example, conductive metallic oxide, such as tin oxide, a zinc oxide, indium oxide, and indium tin oxide (ITO), To metals, such as gold, silver, chromium, and nickel, and a pan, or mixture or laminated material of these metals and conductive metallic oxide, Organic conductivity ingredients, such as inorganic conductivity matter, such as copper iodide and copper sulfide, the poly aniline, the poly thiophene, and polypyrrole, the laminated material of these and ITO, etc. are mentioned. Preferably It is conductive metallic oxide and ITO is desirable from points, such as productivity, high conductivity, and transparency, especially. Although the thickness of an anode plate is selectable suitably by the ingredient, usually the thing of the range of 10nm - 5 micrometers is desirable, and is 50nm - 1 micrometer more preferably, and it is 100nm - 500nm still more preferably.

[0041] What usually carried out the stratification of the anode plate on soda lime glass, alkali free glass, a transparence resin substrate, etc. is used. When using glass, in order to lessen the elution ion from glass, about the quality of the material, it is desirable to use alkali free glass. Moreover, when using soda lime glass, it is desirable to use what gave barrier coating sealant, such as a silica. If the thickness of a substrate is enough to maintain a mechanical strength, there will be especially no limit, but in using glass, it usually uses a thing 0.7mm or more preferably 0.2mm or more. Although various approaches are used for production of an anode plate with an ingredient, in ITO, film formation is carried out by approaches, such as an electron beam method, the sputtering method, resistance heating vacuum deposition, chemical reaction methods (sol-gel method etc.), and spreading of the distributed object of indium tin oxide, for example. By processing of washing and others, the driver voltage of a component is lowered or an anode plate can also raise luminous efficiency. For example, in ITO, UV-ozonization, plasma treatment, etc. are effective. Cathode supplies an electron to an electron injection layer, an electronic transportation layer, a luminous layer, etc., and is chosen in consideration of adhesion with the layer which adjoins negative electrodes, such as an electron injection layer, an electronic transportation layer, and a luminous layer, ionization potential, stability, etc. As an ingredient of cathode, a metal, an alloy, a metal halogenide, a metallic oxide, an electrical conductivity compound, Or such mixture can be used and it is alkali metal (for example, it Li(s)) as an example. the fluorides, such as Na, K, and Cs, and an oxide, and alkaline earth metal (for example, Mg --) The fluorides, such as calcium, and an oxide, gold, silver, lead, ARUNIUMU, sodium-potassium alloys, or those mixed metals, Lithium-aluminium alloys or those mixed metals, magnesium-silver alloys, or those mixed metals, Rare earth metals, such as an indium and ITTERIBIUMU, etc. are mentioned, a work function is an ingredient 4eV or less preferably, and they are aluminum, lithium-aluminium alloys or those mixed metals, magnesium-silver alloys, or those mixed metals more preferably. Cathode can also take the laminated structure not only containing the monolayer structure of the above-mentioned compound and mixture but the above-mentioned compound and mixture. Although the thickness of cathode is selectable suitably by the ingredient, usually the thing of the range of 10nm - 5 micrometers is desirable, and is 50nm - 1 micrometer more preferably, and it is 100nm - 1 micrometer still more preferably. Approaches, such as an electron beam method, the sputtering method, resistance heating vacuum deposition, and a coating method, are used for production of cathode, and vapor-depositing a metal alone can also vapor-deposit two or more components to coincidence. Furthermore, the alloy which is possible also for vapor-depositing two or more metals to coincidence, and forming an alloy electrode, and was adjusted beforehand may be made to vapor-deposit. The lower one of the sheet resistance of an anode plate and cathode is desirable, and below its hundreds of ohms / \*\* are desirable.

[0042] If the layer which has the function to in\_which an electron can be poured in from cathode or an electron injection layer, and an electronic transportation layer, and the function, to which the poured-in charge is moved and the function offer an electron hole and the place of electronic recombination and make them emit light can be formed while the ingredient of a luminous layer can pour in an electron hole from an anode plate or a hole-injection layer, and an electron hole transportation layer at the time of electric-field impression, it is good anything. For example, a benzooxazole derivative, a benzimidazole derivative, a benzothiazole derivative, A styryl benzene derivative, a polyphenyl derivative, a diphenyl butadiene derivative, A tetra-phenyl butadiene derivative, the North America Free Trade Agreement RUIMIDO derivative, a coumarin derivative, A perylene derivative, a peri non derivative, an OKISA

diazole derivative, an aldazine derivative, A PIRARIJIN derivative, a cyclopentadiene derivative, a bis-styryl anthracene derivative, The Quinacridone derivative, a pyrrolo pyridine derivative, a thiadiazolo pyridine derivative, A cyclopentadiene derivative, a styryl amine derivative, an aromatic dimethyldiyne compound, Polymer compounds [ , such as the poly thiophene, polyphenylene and polyphenylene vinylene, ], such as various metal complexes, an alt.metal-ized complex, etc. which are represented by the metal complex and rare earth complex of an eight-quinolinol derivative, etc. are mentioned.

Although especially the thickness of a luminous layer is not limited, usually the thing of the range of 1nm - 5 micrometers is desirable, and is 5nm - 1 micrometer more preferably, and it is 10nm - 500nm still more preferably. although especially the formation approach of a luminous layer is not what is limited -- resistance heating vacuum evaporatio, an electron beam, sputtering, a molecule laminated layers method, coating methods (a spin coat method, the cast method, dip coating method, etc.), and LB -- approaches, such as law, print processes, and the ink jet method, are used, and they are resistance heating vacuum evaporatio and a coating method preferably.

[0043] What is necessary is just to have the ingredient of a hole-injection layer and an electron hole transportation layer in any of the function to pour in an electron hole from an anode plate, the function to convey an electron hole, and the function that carries out the obstruction of the electron poured in from cathode. As the example, a carbazole derivative, a triazole derivative, an oxazole derivative, An OKISA diazole derivative, an imidazole derivative, the poly aryl alkane derivative, A pyrazoline derivative, a pyrazolone derivative, a phenylenediamine derivative, An arylamine derivative, an amino permutation chalcone derivative, a styryl anthracene derivative, full -- me -- non -- a derivative, a hydrazone derivative, a stilbene derivative, and a silazane derivative -- An aromatic series tertiary-amine compound, a styryl amine compound, an aromatic series JIMECHIRI DIN system compound, Conductive polymer oligomer, such as a porphyrin system compound, a polysilane system compound, the Pori (N-vinylcarbazole) derivative, an aniline system copolymer, thiophene oligomer, and the poly thiophene, etc. is mentioned. Although especially the thickness of a hole-injection layer and an electron hole transportation layer is not limited, usually the thing of the range of 1nm - 5 micrometers is desirable, and is 5nm - 1 micrometer more preferably, and it is 10nm - 500nm still more preferably. A hole-injection layer and an electron hole transportation layer may be monolayer structures which consist of one sort of the ingredient mentioned above, or two sorts or more, and may be multilayer structure which consists of two or more layers of the same presentation or a different-species presentation. as the formation approach of a hole-injection layer and an electron hole transportation layer -- vacuum evaporation technique and LB -- law, the ink jet method, the approaches (a spin coat method, the cast method, dip coating method, etc.) of dissolving or distributing a solvent and coating it with said hole-injection transportation agent, and print processes are used. In the case of a coating method, it can dissolve or distribute with a resinous principle, and a polyvinyl chloride, a polycarbonate, polystyrene, polymethylmethacrylate, poly butyl methacrylate, polyester, polysulfone, polyphenylene oxide, polybutadiene, Pori (N-vinylcarbazole), hydrocarbon resin, ketone resin, phenoxy resin, a polyamide, ethyl cellulose, vinyl acetate, ABS plastics, polyurethane, melamine resin, an unsaturated polyester resin, alkyd resin, an epoxy resin, silicon resin, etc. are mentioned as a resinous principle.

[0044] What is necessary is just to have the ingredient of an electron injection layer and an electronic transportation layer in any of the function to pour in an electron from cathode, the function to convey an electron, and the function that carries out the obstruction of the electron hole poured in from the anode plate. Although especially the thickness of an electron injection layer and an electronic transportation layer is not limited, usually the thing of the range of 1nm - 5 micrometers is desirable, and is 5nm - 1 micrometer more preferably, and it is 10nm - 500nm still more preferably. An electron injection layer and an electronic transportation layer may be monolayer structures which consist of one sort of the ingredient mentioned above, or two sorts or more, and may be multilayer structure which consists of two or more layers of the same presentation or a different-species presentation. as the formation approach of an electron injection layer and an electronic transportation layer -- vacuum evaporation technique and LB -- law, the ink jet method, the approaches (a spin coat method, the cast method, dip coating method, etc.) of dissolving or distributing a solvent and coating it with said electron injection transportation

agent, print processes, etc. are used. In the case of a coating method, it can dissolve or distribute with a resinous principle, and what was illustrated as a resinous principle in the case of for example, the hole-injection transportation layer can be applied.

[0045] What is necessary is just to have the function which inhibits that what promotes component degradation of moisture, oxygen, etc. as an ingredient of a protective layer enters in a component. As the example, In, Sn, Pb, Au, Cu, Ag, aluminum, Metals, such as Ti and nickel, MgO, SiO and SiO<sub>2</sub>, aluminum<sub>2</sub>O<sub>3</sub>, GeO, NiO, CaO, BaO, Fe<sub>2</sub>O<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>, the metallic oxide of TiO<sub>2</sub> grade, MgF<sub>2</sub>, LiF, AlF<sub>3</sub>, the metal fluoride of CaF<sub>2</sub> grade, polyethylene, Polypropylene, polymethylmethacrylate, polyimide, poly urea, Polytetrafluoroethylene, polychlorotrifluoroethylene resin, poly dichlorodifluoroethene, The copolymer of chlorotrifluoroethylene and dichlorodifluoroethene, The copolymer which is made to carry out copolymerization of the monomer mixture containing tetrafluoroethylene and at least one sort of comonomers, and is obtained, the fluorine-containing copolymer which has cyclic structure in a copolymerization principal chain, the absorptivity matter of 1% or more of water absorption, the dampproof matter of 0.1% or less of water absorption, etc. are mentioned. the formation approach of a protective layer -- especially -- limitation -- there is nothing -- for example, a vacuum deposition method, the sputtering method, a reactive sputtering method, and MBE (molecular beam epitaxy) -- law, the ionized cluster beam method, the ion plating method, a plasma polymerization method (the high-frequency excitation ion plating method), a plasma-CVD method, a laser CVD method, a heat CVD method, a gas source CVD method, a coating method, the ink jet method, and print processes are applicable.

[0046]

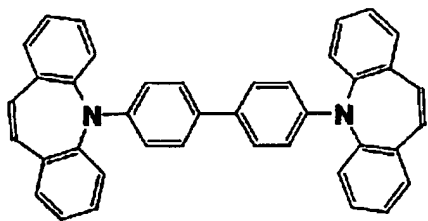
[Example] Although an example is given to below and this invention is concretely explained to it, thereby, this invention is not limited.

(Example 1) What produced ITO by the thickness of 150nm on the 25mmx25mmx0.7mm glass substrate (Tokyo Sanyo Vacuum Co., Ltd. make) was used as the transparence support substrate. About 10nm of copper phthalocyanines was vapor-deposited for this transparence support substrate after etching and washing. Next, it is Alq as TPD (N, N'-screw (3-methylphenyl)-N, N'-diphenyl benzidine) about 40nm and the 3rd layer. About (tris (8-hydroxyquinolate) aluminum) 60nm was vapor-deposited under the condition of a substrate temperature room temperature in the vacuum of 10<sup>-3</sup> to ten to 4 Pa in order. After installing the mask (mask with which luminescence area is set to 5mmx5mm) which carried out patterning on the organic thin film and carrying out 250nm vapor codeposition of magnesium:silver =10:1 within vacuum evaporatono equipment, 300nm of silver was vapor-deposited and the component 101 was produced. EL elements 102-108 of the completely same presentation as 101 were produced to the component 101 except having used two sorts of comparison compounds, and five sorts of compounds of this invention instead of TPD. using TOYO source major unit 2400 mold, a direct-current constant voltage is impressed to an EL element, and light is emitted -- making -- the brightness -- luminance-meter BM-8 and luminescence wavelength of TOPCON CORP. -- the Hamamatsu Photonics make -- it measured using spectrum analyzer PMA-11. The thing of the analog to which, as for an emission spectrum, every sample has lambdamax in the range of 525nm - 530nm was obtained. The result of having measured the maximum of the external quantum efficiency of luminescence which calculated from the luminescence energy which integrated with and obtained all emission spectrum fields, and the power consumption at that time, and the maximum luminescence reinforcement is shown in Table 1.

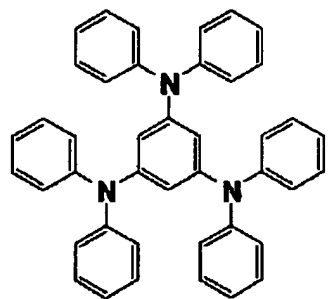
[0047]

[Formula 13]

A-1



A-2



[0048]

[Table 1]

表 1

発光素子 No.	第 2 層素材	最大発光輝度(cd/cm <sup>2</sup> )	最大発光外部量子収率 (%)
101 (比較例)	TPD	14000	2.7
102 (比較例)	A-1	15000	2.8
103 (比較例)	A-2	14000	2.7
104 (本発明)	HT-15	15000	2.8
105 (本発明)	HT-17	16000	2.9
106 (本発明)	HT-18	15000	2.9
107 (本発明)	HT-20	16000	3.0
108 (本発明)	HT-21	16000	2.8

[0049] Moreover, after enclosing these components into the autoclave permuted by argon gas and saving them for the bottom of a 85-degree C heating condition, and ten days, the result of having performed same measurement-of-luminance - and luminescence side-like observation is shown in Table 2.

[0050]

[Table 2]

表 2

発光素子 No.	第 2 層素材	最大発光輝度(cd/cm <sup>2</sup> )	最大発光外部量子収率 (%)
101 (比較例)	TPD	2500	0.6
102 (比較例)	A-1	2400	0.6
103 (比較例)	A-2	2700	0.7
104 (本発明)	HT-15	12000	2.3
105 (本発明)	HT-17	14000	2.6
106 (本発明)	HT-18	13000	2.5
107 (本発明)	HT-20	14000	2.7
108 (本発明)	HT-21	13000	2.8

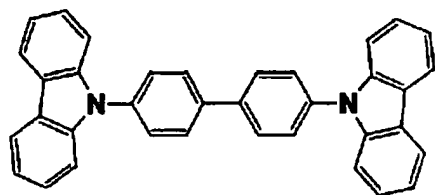
[0051] Although the luminescence engine performance immediately after component production is equivalent to the compound of this invention, with the components 101-103 using a comparison compound, the engine performance after preservation will fall greatly, so that clearly from the result of Tables 1 and 2. On the other hand, it turns out that the compound of this invention has the high luminescence engine performance after preservation.

[0052] (Example 2) About 10nm of copper phthalocyanines was vapor-deposited on the ITO glass substrate etched and washed like the example 1. Carrying out vapor codeposition so that it may be set to TPD about 40nm as the 2nd layer and CBP and triplet exciton luminescent-material TL-1 may besides be set to 95:5 by the mole ratio as the 3rd layer, further, in the vacuum of 10<sup>-3</sup> to ten to 4 Pa, under the condition of a substrate temperature room temperature, it vapor-deposited and the laminating of the about 25nm TIMP about 40nm was carried out to order as the 4th layer. After installing the mask (mask with which luminescence area is set to 5mmx5mm) which carried out patterning on the organic thin film and carrying out 250nm vapor codeposition of magnesium:silver =10:1 within vacuum evaporation equipment, 300nm of silver was vapor-deposited and the component 201 was produced.

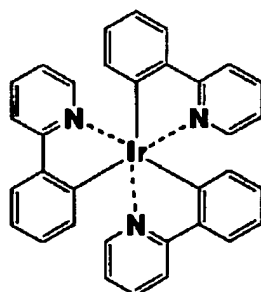
[0053]

[Formula 14]

**CBP**



**TL-1**

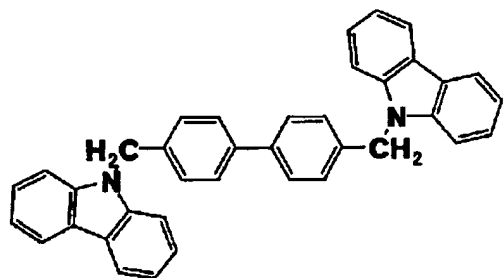


[0054] EL elements 202-208 of the completely same presentation as 201 were produced to the component 201 except having used two sorts of comparison compounds, and five sorts of compounds of this invention instead of CBP.

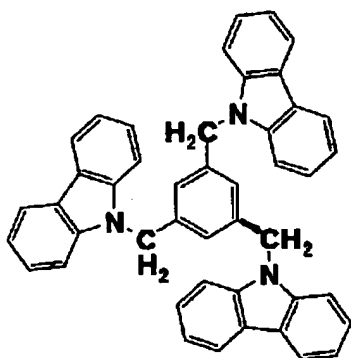
[0055]

[Formula 15]

**A-3**



**A-4**



[0056] Luminescence of the component produced like the example 1 was measured. The thing of the analog to which, as for an emission spectrum, every sample has  $\lambda_{\text{max}}$  in the range of 530nm - 535nm was obtained. The result of having measured the maximum and the maximum luminescence reinforcement of external quantum efficiency of luminescence is shown in Table 3 like an example 1.

[0057]

[Table 3]

表 3

発光素子 No.	第 3 層素材	最大発光輝度 (cd/cm <sup>2</sup> )	最大発光外部量子収率 (%)
201 (比較例)	CBP	47000	13
202 (比較例)	A-3	45000	13
203 (比較例)	A-4	43000	12
204 (本発明)	HT-1	49000	14
205 (本発明)	HT-3	48000	13
206 (本発明)	HT-6	50000	14
207 (本発明)	HT-9	51000	15
208 (本発明)	HT-13	49000	14

[0058] Moreover, after enclosing these components into the autoclave permuted by argon gas like the



example 1 and saving them for the bottom of a 85-degree C heating condition, and ten days, the result of having performed same measurement-of-luminance - and luminescence side-like observation is shown in Table 4.

[0059]

[Table 4]

表 4

発光素子 No.	第 3 層素材	最大発光輝度(cd/cm <sup>2</sup> )	最大発光外部量子収率 (%)
201 (比較例)	CBP	5500	2.2
202 (比較例)	A-3	7500	2.3
203 (比較例)	A-4	9000	2.5
204 (本発明)	HT-1	41000	12
205 (本発明)	HT-3	39000	12
206 (本発明)	HT-6	42000	13
207 (本発明)	HT-9	40000	12
208 (本発明)	HT-13	41000	13

[0060] Although the luminescence engine performance immediately after component production is equivalent to the compound of this invention, with the components 201-203 using a comparison compound, the engine performance after preservation will fall greatly, so that clearly from the result of Tables 3 and 4. On the other hand, it turns out like an example 1 that the compound of this invention has the high luminescence engine performance after preservation.

[0061] (Example 3) On the ITO glass substrate etched and washed like the example 1, after carrying out the spin coat of the Pori [(3, 4-ethylene dioxy) 5-thiophene] and the -2 and polystyrene sulfonate distribution object (the product made from Bayer: 1.3% of Baytron P solid content), the vacuum drying was carried out for 150-degree-C 2 hours, and the spreading layer of 100nm of thickness was formed. The spin coat of the solution which besides dissolved as a luminous layer and dissolved TL-1 1mg in 1,2-dichloroethane 2ml as Pori (N-vinylcarbazole (PVK)) 20mg, CBP 20mg, PBD (2-(4'-t-buthylphenyl)- 5-(4''-(phenyl) phenyl)- 1, 3, 4-OKISA diazole) 12mg, and a luminescent material was carried out. The thickness of this spreading film was about 120nm. The mask (mask with which luminescence area is set to 5mm x5mm) which carried out patterning is installed on an organic thin film, and it is 250nm about magnesium:silver =10:1 within vacuum evaporationno equipment. After carrying out vapor codeposition, 300nm of silver was vapor-deposited and the component 301 was produced. EL elements 302-306 of the completely same presentation as 301 were produced to the component 301 except having used two sorts of comparison compounds, and three sorts of compounds of this invention instead of CBP. Luminescence of the component produced like the example 1 was measured. The thing of the analog to which, as for an emission spectrum, every sample has  $\lambda_{\text{max}}$  in the range of 530nm - 535nm was obtained. The result of having measured the maximum and the maximum luminescence reinforcement of external quantum efficiency of luminescence is shown in Table 5 like an example 1.

[0062]

[Table 5]

表 5

発光素子 No.	有機層素材	最大発光輝度(cd/cm <sup>2</sup> )	最大発光外部量子収率 (%)
301 (比較例)	CBP	17000	6.7
302 (比較例)	A-3	16000	6.5
303 (比較例)	A-4	14000	5.8
304 (本発明)	HT-1	21000	8.2
305 (本発明)	HT-3	22000	8.6
306 (本発明)	HT-7	21000	8.5

[0063] Moreover, after enclosing these components into the autoclave permuted by argon gas like the example 1 and saving them for the bottom of a 85-degree C heating condition, and ten days, the result of having performed same measurement-of-luminance - and luminescence side-like observation is shown in Table 6.

[0064]

[Table 6]

表 6

発光素子 No.	有機層素材	最大発光輝度(cd/cm <sup>2</sup> )	最大発光外部量子収率 (%)
301 (比較例)	CBP	1200	0.7
302 (比較例)	A-3	1000	0.6
303 (比較例)	A-4	1100	0.5
304 (本発明)	HT-1	15000	7.1
305 (本発明)	HT-3	14000	6.9
306 (本発明)	HT-7	16000	7.3

[0065] Although the luminescence engine performance immediately after component production is equivalent to the compound of this invention, with the components 301-303 using a comparison compound, the engine performance after preservation will fall greatly, so that clearly from the result of Tables 5 and 6. On the other hand, it turns out like an example 1 that the compound of this invention has the high luminescence engine performance after preservation.

[0066]

[Effect of the Invention] The compound of this invention is \*\*\*\*\* about the light emitting device brightness excelled [ light emitting device ] in the endurance of a component highly by having good electron hole transportation ability, and excelling in endurance, and using it.

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[Translation done.]